

WHAT IS CLAIMED IS:

1. A data recording apparatus comprising:

a recording/erase unit configured to record or  
erase target data by irradiating a DVD-RW medium with  
5 light beams with different intensities to change a  
phase change recording layer of the medium to a first  
data recorded state, second data recorded state, and  
data non-recorded state; and

an additional recording control unit configured to  
10 control additional recording of target data in response  
to an additional recording instruction by recording the  
target data by changing the phase change recording  
layer to the first and second data recorded states and  
by changing the phase change recording layer to the  
15 data non-recorded state from a recording terminal end  
of the target data over a predetermined length using  
the light beams with different intensities emitted by  
the recording/erase unit.

2. An apparatus according to claim 1, wherein the  
20 additional recording control unit searches for an area  
in the data non-recorded state with the predetermined  
length in response to the additional recording  
instruction, and records the target data from one end  
to the other end of the found area.

25 3. An apparatus according to claim 1, wherein the  
additional recording control unit searches for an area  
in the data non-recorded state with the predetermined

length, which is present on an innermost periphery side in a data recording area of the medium, in response to the additional recording instruction, and records the target data from one end to the other end of the found area.

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4. An apparatus according to claim 1, wherein the additional recording control unit searches for an area in the data non-recorded state with the predetermined length, which is present on an innermost periphery side in a data recording area of the medium, by skipping in increments of predetermined length from a start point on the innermost periphery side of the data recording area of the medium in response to the additional recording instruction, and records the target data from one end to the other end of the found area.

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5. A data recording method for additionally recording target data on a DVD-RW medium in response to an additional recording instruction, comprising:

recording target data by irradiating the medium with light beams with different intensities to change a phase change recording layer of the medium to a first data recorded state and second data recorded state; and

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changing the phase change recording layer to a data non-recorded state by irradiating the medium with a light beam of a predetermined intensity from a recording terminal end of the target data over a predetermined length.

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6. A method according to claim 5, wherein an area  
in the data non-recorded state with the predetermined  
length is searched for in response to the additional  
recording instruction, and the target data is recorded  
5 from one end to the other end of the found area.

7. A method according to claim 5, wherein an area  
in the data non-recorded state with the predetermined  
length, which is present on an innermost periphery side  
in a data recording area of the medium, is searched for  
10 in response to the additional recording instruction,  
and the target data is recorded from one end to the  
other end of the found area.

8. A method according to claim 5, wherein an area  
in the data non-recorded state with the predetermined  
15 length, which is present on an innermost periphery side  
in a data recording area of the medium, is searched for  
by skipping in increments of predetermined length from  
a start point on the innermost periphery side of the  
data recording area of the medium in response to the  
20 additional recording instruction, and the target data  
is recorded from one end to the other end of the found  
area.

9. A DVD-RW medium comprising a phase change  
recording layer,

25 wherein the phase change recording layer is  
changed to a first data recorded state, second data  
recorded state, and data non-recorded state upon being

irradiated with light beams with different intensities,  
and

the phase change recording layer records target  
data when the phase change recording layer is changed  
5 to the first and second data recorded states, and the  
phase change recording layer is changed to the data  
non-recorded state over a predetermined length from  
a recording terminal end of the target data, upon being  
irradiated with the light beams with different  
10 intensities corresponding to additional recording  
control of the target data.

10. A medium according to claim 9, wherein the  
target data is recorded from one end to the other end  
of an area in the data non-recorded state with the  
15 predetermined length, which is found by a search from  
the phase change recording layer, in correspondence  
with additional recording control of the target data.

11. A medium according to claim 9, wherein the  
target data is recorded from one end to the other end  
20 of an area in the data non-recorded state with the  
predetermined length, which is found by a search from  
the phase change recording layer and is present on an  
innermost periphery side, in correspondence with  
additional recording control of the target data.

12. A medium according to claim 9, wherein the  
25 target data is recorded from one end to the other end  
of an area in the data non-recorded state with the

predetermined length, which is found by a search by skipping in increments of predetermined length from a start point on an innermost periphery side of the phase change recording layer and is present on the  
5 innermost periphery side, in correspondence with additional recording control of the target data.